PROCEEDING ON

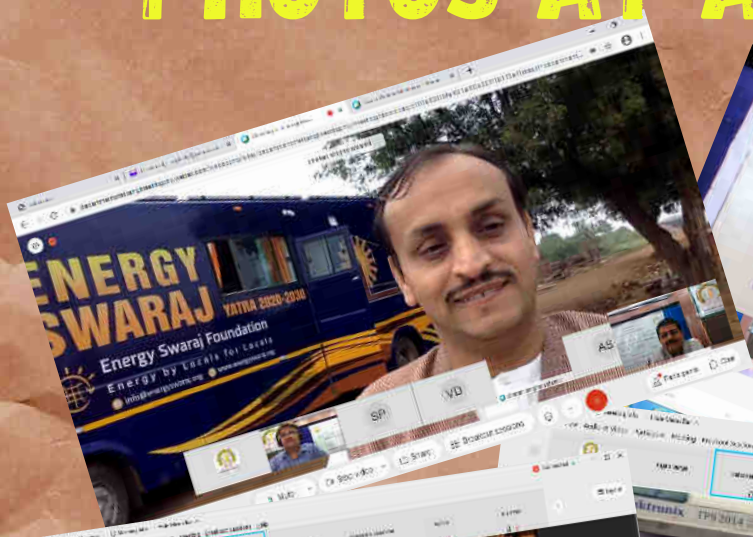
AICTE SPONSORED SHORT TERM TRAINING PROGRAM 2020

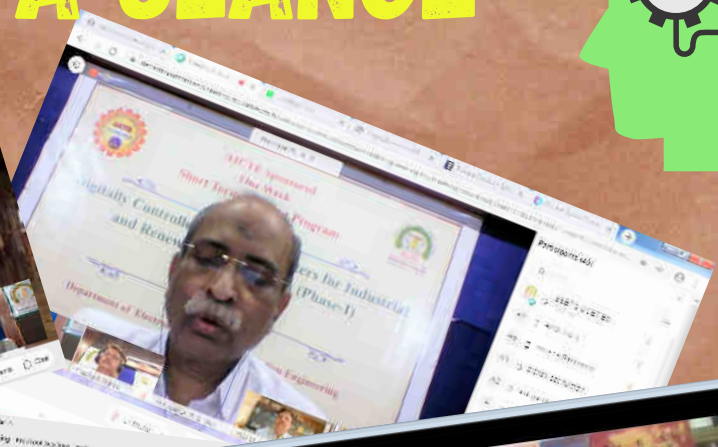
THREE PHASES
VIRTUAL SESSIONS

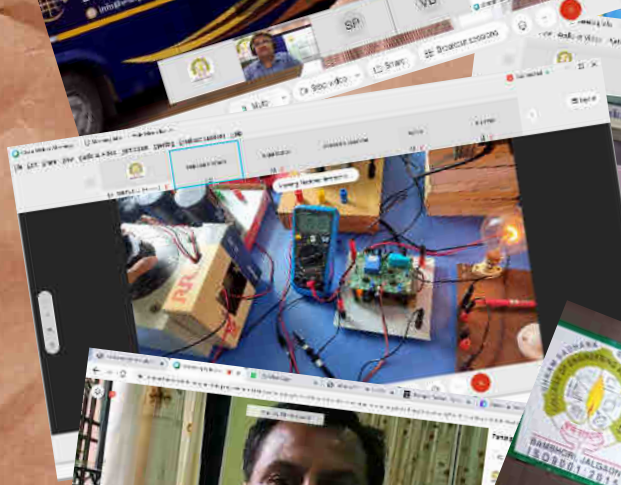
ORGANIZED BY

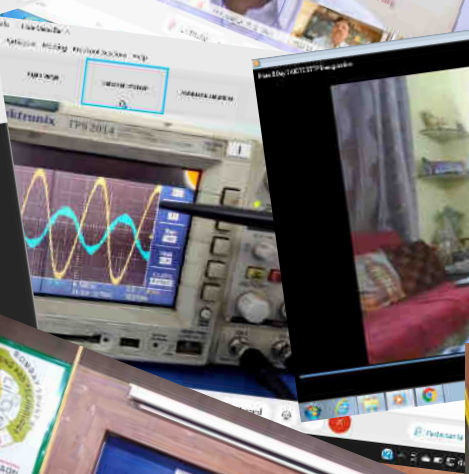
Department of Electronics & Telecommunication and
Department of Electrical Engineering
Shrama Sadhana Bombay Trust's
College of Engineering and Technology
Bambhori, Jalgaon

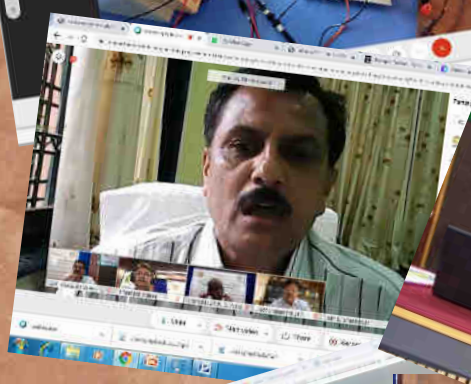
PHOTOS AT A GLANCE

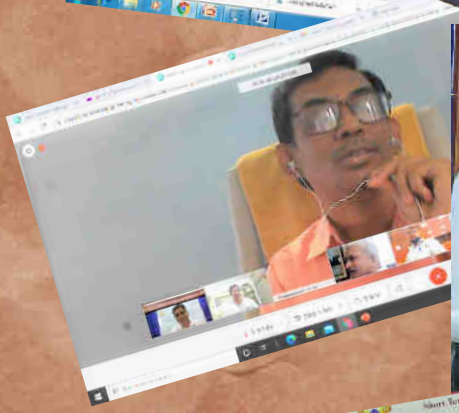


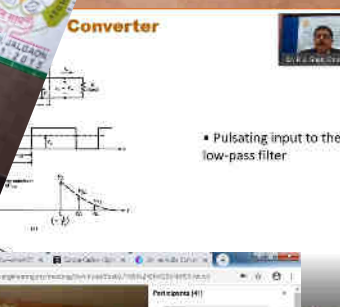












AICTE SPONSORED SHORT TERM TRAINING PROGRAM 2020

PROCEEDING ON AICTE SPONSORED SHORT TERM TRAINING PROGRAM

DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL & RENEWABLE APPLICATIONS UNDER AQIS SCHEME PHASE-I, II & III

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SHRI. RAOSAHEB D. SHEKHAWAT
MANAGING TRUSTEE

PATRONS
DR. KISHOR S. WANI, PRINCIPAL
DR. SANJAY P. SHEKHAWAT, VICE PRINCIPAL

CONVENER
DR. PARESH J. SHAH
PROFESSOR, E&TC DEPARTMENT

STEERING COMMITTEE
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DR. PARESH J. SHAH, MEMBER SECRETARY
DR. SHEKHAR R. SURALKAR, MEMBER
MR. VIJAY S. PAWAR, MEMBER
DR. PRASHANT V. THAKRE, MEMBER

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MR. NILESH S. MAHAJAN
MR. SATPAL D. RAJPUT

Shrama Sadhana Bombay Trust's
COLLEGE OF ENGINEERING AND TECHNOLOGY
BAMBHORI, JALGAON

Shrama Sadhana Bombay Trust's

COLLEGE OF ENGINEERING AND TECHNOLOGY

BAMBHORI, JALGAON

ABOUT INSTITUTE

Shram Sadhana Bombay Trust runs the College of Engineering & Technology, Bambhori, Jalgaon, which is one of the important industrial towns & district headquarters of Maharashtra State. SSBT's COET campus is lush green spread over 25 acres area and located on the bank of River Girna. The campus is well equipped with important amenities such as classrooms, drawing halls, laboratories, seminar halls, library, computer center, workshop, hostels, canteens, faculty quarters, and indoor as well as outdoor sports facilities, etc. The College was accredited by the National Board of Accreditation, New Delhi for three times, and presently NAAC accredited with B++ grade.

UNDER GRADUATE (UG) COURSES

Bio-Technology
Civil Engineering
Chemical Engineering
Computer Engineering
Electrical Engineering
Electronics & Tele. Engineering
Mechanical Engineering
Information Technology

PH.D. PROGRAMMES

Bio-Technology
Civil Engineering
Chemical Engineering
Computer Engineering
Electrical Engineering
Electronics & Tele. Engineering
Mechanical Engineering

ABOUT E&TC DEPARTMENT

In the establishment year of college 1983, the Electronics Engg. The branch was started & as per the need of time, it was converted to Electronics and Telecommunication from the academic year 2001. The department has been NBA Accredited by the National Board of Accreditation (NBA) Committee constituted under AICTE three times. During the last 37 years, the department developed twelve well-equipped and furnished labs along with a Seminar room, departmental library, separate departmental Computer labs with soft wares like MATLAB, XILINX, DSP, ULTIBOARD, ORCAD, etc, & reception of Eklavya Channel from IIT Powai for students. The present intake of the department is 60. The department has maintained the track of excellent results by securing Ist Rank and Gold Medal at university level examination. The department has ten well-equipped laboratories for UG and two labs for PG. Department has a recognized research laboratory under Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra. It has a highly-qualified, devoted & dedicated team of teaching staff members. A conducive environment exists in the department for both students & staff.

ABOUT ELECTRICAL DEPARTMENT

Department of Electrical Engineering is established in the year 1999 with an intake of 60. The department was accredited for 5 years by N.B.A., New Delhi. The department has maintained the track of excellent results by securing Ist Rank and Gold Medal at university level examination. The department has ten well-equipped laboratories for UG and two labs for PG.

The department has signed MoU with National Infotech, Stuart, and watt Solution Pvt. Ltd. IIT Bombay, Prince of Songkhla University, Thailand, to enhance the quality-based educational experience for students, researchers as well faculties. Hands-on-training programs are organized regularly. Department has recognized research laboratory under Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra. Research scholars are working in the field of power quality, power electronics, and renewable energy.

ABOUT STTP

Short Term Training Program (STTP) intends to conduct faculty training through financial assistance from AICTE (under AQIS scheme) to enable faculty members in the field of technical education to introspect and learn techniques that can help prepare students for active and successful participants in a knowledge society. This STTP will definitely enhance the knowledge of every researcher, faculty, and student working in the power electronics area. The participants will also be able to gain practical knowledge during the practical session to be conducted by National Infotech, Surat. National InfoTech (NITech) is working in the field of power electronics, embedded system development, and custom industrial automation. NITech comes into existence in the year 2001 initially started as a training center in embedded systems, power electronics, industrial instrumentation, and automation. Later NITech diverted to developing educational trainers for academic institutes and industrial solutions.

COURSE BACKGROUND

AICTE had sanctioned the grant of Rs. 366667/- to Dr. Paresh J. Shah, Professor, Electronics and Telecommunication Department for the conduct Short Term Training Program on "Digitally Controlled Power Converters for Industrial and Renewable Applications" under AQIS scheme on 10th August with AICTE Sanctioned letter no. 34-66/492/FDC/STTP/Policy-1/2019-20, dated 10/08/2020. The permission was given to conduct it in physical mode. But due to pandemic, the COVID-19, most of the Institutes were facing difficulties in organization and conduct STTPs. Then AICTE sent a letter to conduct STTPs through online mode. As per the AICTE letter regarding the conduction of STTP through online mode, dated 14/09/2020, the Institute has to conduct more than one STTPs in multiple of Rs. 93000/- within the total grant received and should return the balanced unspent amount to AICTE. Accordingly, the institute has planned and conducted three STTPs on the following dates.

Phase I - 26th to 31st October 2020
Phase II - 23rd to 28th November 2020
Phase III - 14th to 19th December 2020.

COURSE OBJECTIVES

The main objective of this program was to update the faculty members, industry persons, and research scholars about the use of advanced power electronic systems in industrial and renewable applications. The program aims to address key issues such as designing, modeling, implementation, analysis, and study of associated power electronic controllers for monitoring and protection of various appliances for industrial use. We know Power Electronics holds today is the most growing and popular field in Electrical and Electronics Engineering, most of the electrical applications are controlled by power electronics converters due to its important features like high efficiency, small size, and low cost. Participants, who have joined this STTP from different states, such as Uttar Pradesh, West Bengal, Andhra Pradesh, Karnataka, Orissa, Madhya Pradesh, Chhattisgarh, Rajasthan, Gujarat, Himachal Pradesh, Haryana, New Delhi, Goa, and of course Maharashtra state.

All practical sessions were conducted by the team of National Infotech, Surat. National InfoTech is working in the field of power electronics, embedded system development, and custom industrial automation and have a training center in embedded system, power electronics, industrial instrumentation, automation, and developing educational trainers for academic institutes and industrial solution. Mr. Viral M. Takodia is the Director-Technical and Mr. Mohammad Juned Saiyad is the Training Coordinator at National Infotech, Surat.

PHASE - I

Shrama Sadhana Bombay Trust's

COLLEGE OF ENGINEERING AND TECHNOLOGY

BAMBHORI, JALGAON

PHASE-I: 26TH TO 31ST OCTOBER 2020

ONE WEEK ONLINE SHORT TERM TRAINING PROGRAM ON DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL AND RENEWABLE APPLICATIONS UNDER AQIS SCHEME

INTRODUCTION

Every system and machine universally depends on power electronics for the ability to run efficiently and sustainably. Power electronics is the application of solid-state electronics for the control and conversion of electric power. It applies to both the systems and products involved in converting and controlling the flow of electrical energy, allowing the electricity needed for everyday products to be delivered with maximum efficiency in the smallest and lightest package.

COURSE OBJECTIVES

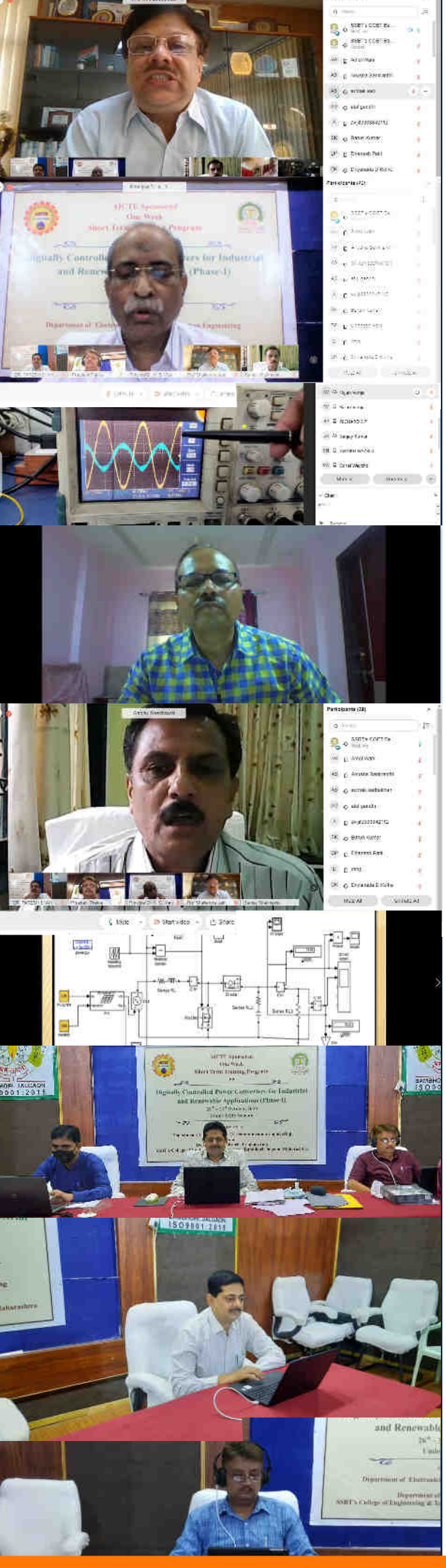
The main objective of this STTP is to update participants about the use of advanced power electronic systems in various applications. Power Electronics plays important role in achieving energy efficiency and a sustainable environment. The STTP aims to address key issues such as designing, modeling, implementation, analysis, and study of associated power electronic controllers for monitoring and protection of various appliances for industrial use. This workshop is intended to provide practical exposure to research scholars, faculty members, and industry personnel. Resource persons will be faculties from NITS, Industry Persons, and In house faculties.

COURSE CONTENTS

1. Fundamentals of Power Electronics
2. Power Electronic Converters and Inverters
3. Control Strategies in Power Electronic System
4. Role of Power Electronics in Solar Applications
5. Simulation and Modeling of Power Electronic Converters and Inverters
6. Interfacing STM32 Microcontroller with MATLAB and Hardware
7. Interfacing LCD, Keyboard, ADC with STM32 Microcontroller
8. Development of Three-phase SPWM and SVM Inverter Circuits with STM32 Microcontroller

EMINENT SPEAKERS

1. Dr. Shailendra Jain, Director, Sant Longowal Institute of Engineering & Technology, Longowal
2. Dr. Mahmadasraf A. Mulla, Sardar Vallabhbhai National Institute of Technology, Surat
3. Dr. Shailendra Kumar Sharma, Shri G. S. Institute of Technology & Science, Indore
4. Dr. Krishna Kumar Gupta, Thapar Institute of Engineering & Technology, Patiala
5. Dr. K. B. Khanchandani, Shri Sant Gajanan Maharaj College of Engineering, Shegaon
6. Dr. Paresh J. Shah, SSBT's College of Engineering and Technology, Jalgaon
7. Dr. Prashant V. Thakre, SSBT's College of Engineering and Technology, Jalgaon



PHASE I

26th to 31st October 2020

DAY 1

INAUGURATION
BY DR. SHAILENDRA JAIN

FUZZY LOGIC CONTROL FOR POWER ELECTRONICS
BY DR. SHAILENDRA JAIN

DAY 2

DEVELOPMENT OF GRID INTERACTIVE SOLAR WATER PUMP
BY DR. M. A. MULLA

DAY 3

DIGITAL CONTROL OF POWER CONVERTERS FOR PHOTOVOLTAIC SUPPLY SYSTEMS.
BY DR. SHAILENDRA SHARMA

DAY 4

ANALYSIS OF POWER CONVERTERS AND ITS APPLICATIONS
BY DR. P. J. SHAH

STUDY AND COMPARATIVE ANALYSIS OF SOLAR PV PANELS
BY DR. P. V. THAKRE

DAY 5

ARTIFICIAL INTELLIGENCE IN POWER ELECTRONICS AND DRIVE CONTROL APPLICATIONS
BY DR. K. B. KHANCHANDANI

DAY 6

MULTILEVEL INVERTERS: CURRENT RESEARCH TRENDS
BY DR. KRISHNA KUMAR GUPTA

VALEDICTORY FUNCTION
BY DR. KRISHNA KUMAR GUPTA

DR. SHAILENDRA JAIN

PH.D. (IITR), PDF (CANADA)

Director
Sant Longowal Institute of Engineering & Technology, Longowal, Punjab
Specialization in Power Electronics

TOPIC DELIVERED AT STTP:

FUZZY LOGIC CONTROL FOR POWER ELECTRONICS

ABSTRACT:

Power electronics has developed rapidly during recent years. It involves the technologies of power semiconductor devices, converter circuits, electrical machines, and VLSI circuits, as well as advanced control theory. Fuzzy logic applications are presently one of the most active research areas in power-electronics. Among the non-linear control methodologies, fuzzy logic has recently been applied widely in power electronics. The success of fuzzy logic controllers seems to be mainly due to their ability to incorporate experience, intuition, and heuristics into the system instead of solely relying on mathematical models.

OUTCOME:

- The application of Fuzzy logic to power electronics and drives will continue to flourish in the near future.
- Most promising applications are those where classical control solutions cannot provide satisfactory performance, typically when the model of the plant is not available or highly non-linear, or when the system is subject to significant parameter variation.
- Fuzzy logic constitutes a powerful tool to translate human expert knowledge into automatic control strategy, a feature that can also be exploited in the design of diagnosis and supervisory control systems.

DR. M. A. MULLA

PH. D.

Associate Professor
Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat
Specialization in Power Electronics, Renewable Energy, Power Quality and Electrical Drives

TOPIC DELIVERED AT STTP:

DEVELOPMENT OF GRID INTERACTIVE SOLAR WATER PUMP

ABSTRACT:

This lecture aims to discuss the development of grid-interactive inverter utilizing the existing solar water pumping systems. The grid inverter is constructed without adding any extra power electronics interface to the existing solar water pumping systems.

OUTCOME:

- Importance of Renewable Sources, Solar Energy and Solar Water Pumping Systems (SWPS) Different Types of SWPS
- Mode of operation – Standalone, grid-connected
- Merits and demerits of SWPS
- Integrated PV inverter development using SWPS.

DR. SHAILENDRA SHARMA

PDF, PH.D

Professor
Shri G. S. Institute of Technology & Science,
Indore, Madhya Pradesh
Specialization in Power Electronics

TOPIC DELIVERED AT STTP:

DIGITAL CONTROL OF CONVERTERS FOR SOLAR POWER DRIVEN SUPPLY SYSTEM

ABSTRACT:

This presentation covers an overview of renewable energy systems. The emphasis is given on applications of solar PV-based supply systems including solar water pumping and HVAC systems. Various topological development and state of art control approaches used on the topic are delivered. Performances using developed prototypes and simulation models are investigated to give deep insight into the specific subject domains.

OUTCOME:

- Developed a basic understanding of solar photovoltaic supply systems for the grid and standalone operation.
- Technical exposure on design and development of solar PV supply system.
- Exposure to developing laboratories for experimentation work for UG/PG students.

DR. PARESH J. SHAH

PH.D.

Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Power Electronics, Power Quality, VLSI Design

TOPIC DELIVERED AT STTP:

ANALYSIS OF POWER CONVERTERS AND ITS APPLICATIONS

ABSTRACT:

Power electronic converters play the role of taking electrical energy from the power system and turning it into a suitable form needed by a motor. The power electronic converter may be determined according to the given power source and the driving motor. Analysis of power converters for emerging applications of power electronics in the areas of control of DC-AC converters for different applications control of DC-DC converters for different applications, control of AC-DC converters for different applications, control of AC-AC converters for different applications, control, and management of energy storage systems and control of AC drive systems.

OUTCOME:

- Understand analysis of basic power electronics converters, and design switched-mode regulators for various industrial applications.
- Comprehend the concepts of different power converters and their applications
- Evaluate the effects of various modulation techniques on the quality of input and output waveforms.
- PWM techniques for voltage and frequency control

DR. PRASHANT V. THAKRE

PH.D.

Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Solar Photovoltaic System

TOPIC DELIVERED AT STTP:

STUDY AND COMPARATIVE ANALYSIS OF PV PANELS

ABSTRACT:

Solar energy is one of the most promising renewable resources that can be used to produce electric energy through the photovoltaic process. Commercial PV cell first developed in bell lab in 1954 with 6% efficiency but only after they used in space programs in 1950's commercial interest surged up. PV system requires special design consideration due to the varying nature of solar power resulting from unpredictable and sudden changes in weather conditions, which change the radiation level as well as the cell operating temperature. This mandates an accurate and reliable simulation of the designed PV system prior to installation.

OUTCOME:

The employment of classical and modified single-diode model with avoiding series and shunt resistance for modeling the electrical performance characteristics of amorphous (a-si) and polycrystalline (p-si) PV modules at same operating conditions in the programming-based simulation script. Varying temperature from 600C to 800C with taking solar irradiance level constant 900 W/m2 and Second, varying solar irradiance level from 600W/m2 to 1000W/m2 with considering constant module temperature 600C. This study provides a clear and concise understanding of the I-V and P-V characteristics of amorphous (a-si) and polycrystalline (p-si) PV modules which will serve as the comparative model for researchers in the field of modeling. Also, comparative study of the modeling I-V and P-V characteristics gives the new idea in near future for improvement in manufacturing technique in amorphous (a-si) and polycrystalline (p-si) technologies to improve power output and efficiency.

DR.K.B. KHANCHANDANI

PH.D.

Professor
Shri Sant Gajanan Maharaj College of Engineering, Shegaon, Maharashtra
Specialization in Power Electronics & Drive control, Artificial Intelligence (Machine Learning & Deep Learning), Signal & Image processing, VLSI & Embedded System Design

TOPIC DELIVERED AT STTP:

ARTIFICIAL INTELLIGENCE IN POWER ELECTRONICS & DRIVE CONTROL APPLICATIONS

ABSTRACT:

Artificial intelligence (AI) techniques, particularly neural networks, are recently having a significant impact on power electronics and motor drives. Neural networks have created a new and advancing frontier in power electronics, which is already a complex and multidisciplinary technology that is going through dynamic evolution in recent years. AI is nowadays a tool that allows computers to find solutions in a better and faster way. AI has the potential to improve the design of power converters. Modeling, simulation, and design of various estimation techniques for Induction motor drives, Sensorless Control of Induction Motor Drives, and Novel Neural Network-based Rotor Flux MRAS Speed Observers were discussed and presented in the Faculty development program.

OUTCOME:

- Various estate estimation techniques for drives control
- Modeling, simulation, and design of Model Reference Adaptive Systems for Induction motor drivers.
- Novel Neural Network-based Rotor Flux MRAS Speed Observers for drive control
- Various research topics in the area of power electronics and drives control.

DR. KRISHNA KUMAR GUPTA

PH.D.

Assistant Professor
Thapar Institute of Engineering and Technology, Patiala, Punjab
Specialization in Power electronics (multilevel converters)

TOPIC DELIVERED AT STTP:

MULTILEVEL INVERTERS: CURRENT RESEARCH TRENDS

ABSTRACT:

Multilevel inverters are fast gaining importance both in industry and academia, mainly due to various advantages offered by them: use of low voltage rated power switches, low dv/dt stress on the switches and the load, much improved harmonic profile, the possibility of fault-tolerant operation, better efficiency and so on. As a result, in the last few decades, multilevel inverters are being researched with great intensity. This session, therefore, focused on the current research trends on multilevel inverters. First, common myths in relation to multilevel inverters were identified by the speaker, and arguments were presented to counter them. An example of Google Little Box Challenge was cited to explain multilevel inverters are fully suitable for low power low voltage applications and may improve the power density of the converter. Thereafter, with the help of suitable topologies, various research areas were identified and explained in detail, such as a reduction in device count, the strategic operation to prevent device failure, power equalization, switching optimization, and fault-tolerant operation.

OUTCOME:

Clear identification of current research trends in the field of multilevel inverters is expected to inspire the participants to carry out research in this area and contribute towards the incorporation of multilevel technology in applications of their choice.

PRACTICAL SESSIONS AT STTP:
MULTILEVEL INVERTERS: CURRENT RESEARCH TRENDS
BY NATIONAL INFOTECH, SURAT

LABORATORIES:

DAY 1: Power Converter Development: Discrete-Time Simulation in MATLAB/Simulink
DAY 2: Interfacing STM32 Microcontroller with MATLAB and Hardware
DAY 3: Interfacing LCD, Keyboard, ADC with STM32 Microcontroller
DAY 4: Development of Inverter Circuits with STM32 Microcontroller
DAY 5: Development of Three-phase SPWM and SVM Inverter Circuits with STM32 Microcontroller

ABSTRACT:

This course aims to teach participants hands-on based learning of the development of advanced power electronics converters. The development of power electronics converters involves designing logic circuits, driver circuits, and power circuits. Good knowledge of AC, DC power conversion is essential. This course aims to teach participants the overall design of power electronics systems. The development of logic circuit, how to perform discrete-time simulation in MATLAB Simulink, Interfacing STM32 Microcontroller with MATLAB and Hardware, Interfacing LCD, ADC, Development of Converter Circuits, Development of Three-Phase SPWM and SVM Inverter Circuits has been taught using ARM Cortex M4 32-bit microcontroller.

OUTCOME:

- Basics of Power Electronics Converters
- Discrete-Time Simulation in MATLAB Simulink
- Interfacing of STM32 Microcontroller with MATLAB and Hardware
- Learning of development of special circuits like 3-phase SPWM and SVM

MR.VIRAL M. TAKODIA

DIRECTOR-TECHNICAL AT NATIONAL INFOTECH, SURAT, GUJARAT

His core area of work is Embedded System - Design and Development. He has completed his B.E. from Saurashtra University, Rajkot, and MTech [Research] from SVNIT, Surat. He has 14+ years of experience in Micro-controller based hardware and firmware development. Further expertise in Electrical and Power Electronics mixed-signal design and development. Experiences include industrial automation, PLCs, SCADA, communication Protocols, Team Lead, and after-hours support for clients. Also working in the field of IoT and I-IoT application programming and hardware design for offshore projects.

MR.MOHAMMAD JUNED SAIYAD

TRAINING COORDINATOR AT NATIONAL INFOTECH, SURAT, GUJARAT

He has completed B.E. and M.E. from Sarvajanik College of Engineering & Technology, Surat, and having experience of 1 year. He has completed his M.E. Thesis on "Power Management of Battery/Ultracapacitor based Hybrid Energy Storage System for Electric Vehicle" under the guidance of NITech.

ABOUT NATIONAL INFOTECH:

National InfoTech (NITech) is working in the field of power electronics, embedded system development, and custom industrial automation. NITech comes into existence in the year 2001 initially started with a training center in embedded systems, power electronics, industrial instrumentation, and automation. Later NITech diverted to developing educational trainers for academic institutes and industrial solutions. NITech has developed a range of microcontroller trainers and add-on cards, educational driver Trainers, power electronics trainers, and advanced power electronics trainers to provide the student a complete platform to launch their career in power electronics, embedded systems, and industrial automation. National Infotech has developed a range of equipment to provide the student a complete platform to learn electrical, instrumentation, and electronics engineering principles and applications. Our products are in form of hardware and software that are used by colleges and universities.

The training division of National Infotech imparts professional training to UG/PG/Ph.D. students and industrial professionals on power electronics, embedded systems, and industrial automation. These training programs are short-duration courses and aimed at bridging the gap between industry and academia.

PHASE - II

Shrama Sadhana Bombay Trust's

COLLEGE OF ENGINEERING AND TECHNOLOGY

BAMBHORI, JALGAON

PHASE-II: 23RD TO 28TH NOVEMBER 2020

ONE WEEK ONLINE SHORT TERM TRAINING PROGRAM ON DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL AND RENEWABLE APPLICATIONS UNDER AQIS SCHEME

INTRODUCTION

Every system and machine universally depends on power electronics for the ability to run efficiently and sustainably. Power electronics is the application of solid-state electronics for the control and conversion of electric power. It applies to both the systems and products involved in converting and controlling the flow of electrical energy, allowing the electricity needed for everyday products to be delivered with maximum efficiency in the smallest and lightest package.

COURSE OBJECTIVES

The main objective of this STTP is to update participants about the use of advanced power electronic systems in various applications. Power Electronics plays important role in achieving energy efficiency and a sustainable environment. The STTP aims to address key issues such as designing, modeling, implementation, analysis, and study of associated power electronic controllers for monitoring and protection of various appliances for industrial use. This workshop is intended to provide practical exposure to research scholars, faculty members, and industry personnel. Resource persons will be faculties from NITS, Industry Persons, and In house faculties.

COURSE CONTENTS

1. Fundamentals of Power Electronics
2. Power Electronic Converters and Inverters
3. Control Strategies in Power Electronics Drives
4. Role of Power Electronics in Electric Vehicles
5. Power quality issues and improvement techniques
6. Simulation and Modeling of Power Electronic Drives
7. Open-loop Scalar Control and Closed-loop Control of Induction Motor with SPWM and SVM.
8. Vector and Direct Torque Control of Induction Motor
9. Control of Electronically Commuted DC (BLDC) Motor and Permanent Magnet Synchronous Motor

EMINENT SPEAKERS

1. Dr. Rakesh Kumar Saxena, Director, Shri G. S. Institute of Technology & Science, Indore, Madhya Pradesh.
2. Dr. Mukesh Singh, Thapar Institute of Engineering & Technology, Patiala, Punjab
3. Dr. Mahmadasraf A. Mulla, Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat
4. Dr. Nitin Gupta, MNIT, Jaipur, Rajasthan
5. Dr. Sanjay L. Badjate, Principal, S.B. Jain Institute of Technology Management & Research Nagpur
6. Dr. Lalit Kumar, NIT, Raipur, Chhattisgarh
7. Dr. Paresh J. Shah, SSBT's College of Engineering and Technology, Jalgaon
8. Dr. Prashant V. Thakre, SSBT's College of Engineering and Technology, Jalgaon

PHASE II

23rd to 28th November 2020

DAY 1

INAUGURATION
BY DR. RAKESH SAXENA

DIGITIZATION OF ELECTRICAL SYSTEM AND SCOPE FOR TESTING AND CONSULTANCY
BY DR. RAKESH SAXENA

DAY 2

HARMONICS: PROBLEMS AND SOLUTIONS
BY DR. NITIN GUPTA

DAY 3

ROLE OF ELECTRIC VEHICLE IN SMART GRID
BY DR. MUKESH SINGH

DAY 4

POWER ELECTRONICS CONVERTER AND ITS CONTROL FOR ELECTRIC VEHICLES
BY DR. LALTIKUMAR SAHU

DAY 5

FIELD ORIENTED CONTROL OF PERMANENT MAGNET SYNCHRONOUS MOTOR (PMSM)
BY DR. M. A. MULLA

DAY 6

POWER QUALITY IMPROVEMENT OF POWER SUPPLIES USING FPGA
BY DR. P. J. SHAH

VALEDICTORY FUNCTION
BY DR. S. L. BADJATE

DR. RAKESH KUMAR SAXENA

PH.D.

Director
Shri G. S. Institute of Technology & Science, Indore, Madhya Pradesh
Specialization in Power Electronics, Power Quality

TOPIC DELIVERED AT STTP:

DIGITIZATION OF ELECTRICAL SYSTEM AND SCOPE FOR TESTING AND CONSULTANCY

ABSTRACT:

As all aspects of the global energy system become more digital, we are already seeing better outcomes for electricity producers, end consumers, the economy, and the environment. The digital transformation of utilities can improve the efficiency of power generation and the transmission and distribution of electricity, all while providing consumers with more capabilities and choices around their energy use. All of this accelerates de-carbonization because less fuel is needed to produce the same amount of power. Digital tools also enhance operation throughout the electricity value network. This increases grid reliability and security and reduces the cost to generate, transmit, and deliver electricity

OUTCOME:

This increases grid reliability and security, and reduces the cost to generate, transmit, and deliver electricity. It helps physical systems to be more productive and autonomous. Our energy infrastructure is getting smarter and the main beneficiaries are people and the planet.

DR. NITIN GUPTA

PH.D.

Assistant Professor
Malaviya National Institute of Technology
Jaipur, Rajasthan
Specialization in Power Electronics, Active Power Filter, Grid Integration of Renewable Energy Sources

TOPIC DELIVERED AT STTP:

HARMONICS: PROBLEMS AND SOLUTIONS

ABSTRACT:

The current focus is on the power electronics used in industrial drives applications, tractions, HVDC links, FACTs, compensators for PQ improvements, Power supplies, and renewable energy (RE) applications. In RE systems especially wind and photovoltaic (PV) applications are on a swing during the last few years. There was a road development in the field of power electronics/power electronics converters which led to more efficient systems and a reduction of the cost per installed kW. Therefore, this presentation highlights the issues aroused due to the penetration of power electronic converters. More specifically, details pertaining to harmonics, its causes, and solutions are provided.

OUTCOME:

The presentation has served as one-stop information for the participants regarding the application of power electronics-based discrete switching loads; its causes on the normal system operation and possible solutions to filter out the harmonics.

DR. MUKESH SINGH

PH.D.

Associate Professor
Thapar Institute of Engineering and Technology, Patiala, Punjab
Specialization in Smart Grid, Vehicle-to-Grid, Renewable energy sources, Distributed generations

TOPIC DELIVERED AT STTP:

ROLE OF ELECTRIC VEHICLE IN SMART GRID

ABSTRACT:

Electric vehicles (EV) are considered to be the future of transportation, as environmental issues become more prominent in the world. EVs have rechargeable batteries that are the heart of EVs to store the electrical energy to commute. In the future, the significant increase in the growth of EVs will equally raise the stress on the electric grid. Therefore, to resolve the problem Vehicle-to-Grid (V2G) concept comes into the picture. The V2G technology allows the EV to operate in two distinct modes that are charging and discharging. On the one side, EVs charges through the grid and used as transportation media. Whereas, on the other side, it acts as an energy source to feed the energy back to the grid during peak-demanding hours. This not only benefits the grid by reducing its stress but also the EV owners by generating revenues. However, V2G is in its nascent stage and involves a lot of research in the area.

OUTCOME:

- Highlighted the need of V2G technology in the society.
- Elements involved in V2G establishment.
- Current mstate of V2G in different countries.
- Scope of research in the V2G area.

DR. LALIT KUMAR SAHU

PH.D.

Assistant Professor
National Institute of Technology, Raipur, Chhattisgarh
Specialization in Power Electronics Converters, Electric Vehicles and Renewable Energy Systems

TOPIC DELIVERED AT STTP:

POWER ELECTRONICS CONVERTER AND ITS CONTROL FOR ELECTRIC VEHICLES

ABSTRACT:

In recent decades, factors such as the worldwide growing concern for pollution-induced climate changes, increasingly stringent emission norms for vehicles, and depleting petroleum resources coupled with volatility in the prices have motivated and accelerated the development of sustainable and clean alternatives for transportation systems. Electrification of vehicular technology(EVT) is considered a promising and sustainable alternative for future transportation systems. In the evolution of EVT, instability of fuel price, fuel economy, range, performance, and costs are the governing factors and prime concerns for researchers, auto manufacturers, and customers. These factors are decided by the design of the electric propulsion system (EPS) and its control for vehicular application and its suitable integration with various electrical and mechanical components. In this talk a comparative overview of EVT along with a comprehensive analysis of EPS and its constituents specifically the role and importance of the power electronics converter and its control has been discussed. Also, a brief discussion on power flow control and management algorithms for EVT is presented. The talk also highlights the ongoing technological advancements and future challenges in the roadmap of EPS and power electronics and its control for the electrification of vehicular technology.

OUTCOME:

in terms of creating awareness among recent trends and advancements of Electric and Hybrid Electric Vehicles and the role of power electronics converter in the sustainable development of the EVT. The participants of this STTP have also benefited from the knowledge of start-ups and entrepreneurial opportunities in this field. This talk has also helped to update the participants about the state-of-the-art technologies and innovations in the field of vehicular electrifications.

DR. M. A. MULLA

PH. D.

Associate Professor
Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat
Specialization in Power Electronics, Renewable Energy, Power Quality and Electrical Drives

TOPIC DELIVERED AT STTP:

FIELD ORIENTED CONTROL OF PERMANENT MAGNET SYNCHRONOUS MOTOR

ABSTRACT:

Permanent Magnet Synchronous Motor is finding wide applications in Electrical Car, Water Pumping Systems and Home Appliances. This lecture aims to discuss the development of field-oriented control of PMSM. The required components like shaft encoder, hall current sensors, and STM32F407 microcontroller are elaborated. The complete development of Field Oriented Control of 1 HP PMSM along with its demonstration is presented.

OUTCOME:

- Importance of the Electrical Drives and Different Electrical Motors
- Permanent Magnet Synchronous Motors (PMSM)
- Development of Scalar Control of PMSM
- Working of Shaft Encoder
- Clarke and Park Transformations
- Field Oriented Control of PMSM

DR. PARESH J. SHAH

PH.D.

Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Power Electronics, Power Quality, VLSI Design

TOPIC DELIVERED AT STTP:

POWER QUALITY IMPROVEMENT OF POWER SUPPLIES USING FPGA

ABSTRACT:

Power quality refers to the ability of electrical equipment to consume the energy being supplied to it. A number of power quality issues including electrical harmonics, poor power factor, voltage instability, and imbalance impact the efficiency of electrical equipment. Power supplies: the controller implements different control strategies: output current demand, efficiency as high as possible. Control is traditionally achieved through analog means, but it more complex, power management is difficult, demanding functionalities that are hardly attainable in analog controllers. With the help of these studies, the power quality problems can be reduced, thereby improving the performance by using several power quality improvements and filtering techniques using digital controller in power supplies.

OUTCOME:

- With the digital controller, it is possible to design a stable, efficient, and rugged converter with a faster transient response for dynamically switching loads.
- THD, PF, and DPF have been reduced for power supply, etc.
- Control approaches with minimum hardware resources and reduced complexity had been made using the FPGA module for the PWM generator.
- The power quality of the converters has been improved, reduction in the size of overall power supplies, improvement in efficiency, lower cost, enhanced reliability, robustness, lightweight, flexibility and portability.

DR.SANJAY L.BADJATE

PH.D.

Principal
S.B. Jain Institute of Technology Management & Research, Nagpur, Maharashtra
Specialization in Complex
Nonlinear Modeling, Neural Network

TOPIC DELIVERED AT STTP:

SCOPE AND APPLICATIONS ON DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL AND RENEWABLE ENERGY

ABSTRACT:

According to an article by ABB, about 40% of the world's power needs are met by electrical energy. That number is quickly rising as the trend towards renewable energy sources has increased. Without power electronics, this energy cannot be harnessed and delivered efficiently and energy from renewable sources, such as solar and wind, could not be fed into the electricity grid. Power electronics allow solar energy to be used by converting the Direct Current energy produced by solar panels into AC, used in the commercial electrical grid. Power electronics is not only used to deliver and control power in the electric grid, but it is also used in numerous everyday devices. Everywhere right from power steering in cars, battery chargers, cell phones, and microwaves utilize power electronics. It is rightly said without power electronics it is difficult to control Electrical or Electronics devices.

OUTCOME:

- Learners know about the importance of digitally controlled power converters.
- Scope in the research in the area of digitally controlled power converters for Industrial and Renewable Energy.

PRACTICAL SESSIONS AT STTP:
DEVELOPMENT OF ELECTRICAL DRIVES
BY NATIONAL INFOTECH, SURAT

LABORATORIES:

DAY 1: Exploring WAIJUNG block set with Matlab
DAY 2: Open-loop Scalar Control of Induction Motor with SPWM and SVM
DAY 3: Closed-loop Control of Induction Motor
DAY 4: Vector and Direct Torque Control of Induction Motor
DAY 5: Control of Electronically Commuted DC

ABSTRACT:

This course aims to teach participants hands-on based learning of the development of Electrical Drives. The development of power electronics converters involves, designing logic circuits, driver circuits, and power circuits. Good knowledge of AC, DC power conversion is essential. This course aims to teach participants the overall design of Electrical Drives. The development of electrical drive and topics like Open Loop/Closed Loop Scalar Control of Induction Motor, Vector and Direct Torque Control of Induction Motor and Control of Electronically commuted DC Motor has been taught using ARM Cortex M4 32-bit microcontroller.

OUTCOME:

- Basics of Electrical Drives
- Open Loop and Closed Loop Scalar Control of Induction Motor
- Vector and Direct Torque Control of Induction Motor
- Control of Electronically Commuted DC Motor with ARM Cortex M4 32-bit microcontroller

PHASE - III

Shrama Sadhana Bombay Trust's

COLLEGE OF ENGINEERING AND TECHNOLOGY

BAMBHORI, JALGAON

PHASE-III: 14TH TO 19TH DECEMBER 2020

ONE WEEK ONLINE SHORT TERM TRAINING PROGRAM ON DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL AND RENEWABLE APPLICATIONS UNDER AQIS SCHEME

INTRODUCTION

Every system and machine universally depends on power electronics for the ability to run efficiently and sustainably. Power electronics is the application of solid-state electronics for the control and conversion of electric power. It applies to both the systems and products involved in converting and controlling the flow of electrical energy, allowing the electricity needed for everyday products to be delivered with maximum efficiency in the smallest and lightest package.

COURSE OBJECTIVES

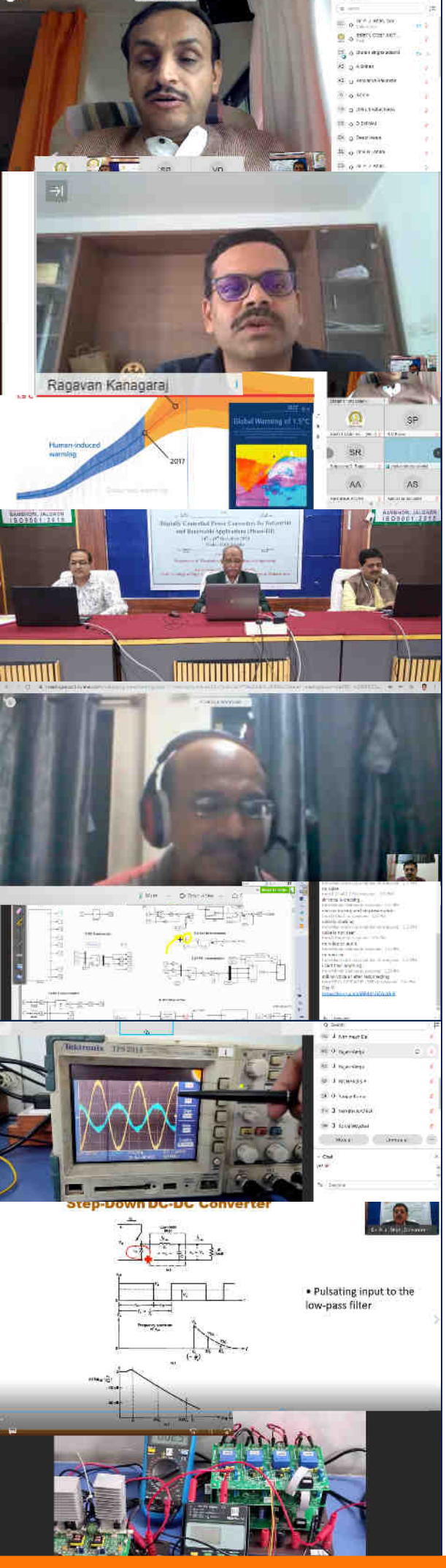
The main objective of this STTP is to update participants about the use of advanced power electronic systems in various applications. Power Electronics plays important role in achieving energy efficiency and a sustainable environment. The STTP aims to address key issues such as designing, modeling, implementation, analysis, and study of associated power electronic controllers for monitoring and protection of various appliances for industrial use. This workshop is intended to provide practical exposure to research scholars, faculty members, and industry personnel. Resource persons will be faculties from NITS, Industry Persons, and In house faculties.

COURSE CONTENTS

1. Fundamentals of Power Electronics
2. Power Electronic Converters and Inverters
3. Control Strategies for Choppers Applications
4. Role of Power Electronics in Solar and Industrial Applications
5. Experimentation on PV Solar Applications
6. Real-time tracing of Solar PV curve and its characteristics
7. Implementation of MPPT algorithm of Solar PV
8. Grid synchronization using PLL/FLL
9. Implementation of PV-Inverter and PV-STATCOM

EMINENT SPEAKERS

1. Dr. Chetan Singh Solanki, Indian Institute of Technology, Bombay
2. Dr. Ragavan Kanagaraj, Indian Institute of Technology, Gandhinagar
3. Dr. Mahmadasraf A. Mulla, Sardar Vallabhbhai National Institute of Technology, Surat, Gujrat
4. Dr. A. K. Panchal, Sardar Vallabhbhai National Institute of Technology, Surat, Gujrat
5. Dr. Paresh J. Shah, SSBT's College of Engineering and Technology, Jalgaon, Maharashtra
6. Dr. Prashant V. Thakre, SSBT's College of Engineering and Technology, Jalgaon, Maharashtra
7. Mr. M. M. Ansari, SSBT's College of Engineering and Technology, Jalgaon, Maharashtra.



PHASE III

14th to 19th December 2020

DAY 1

INAUGURATION
BY DR. CHETAN SINGH SOLANKI

ENERGY SWARAJ: ESSENCE OF SUSTAINABILITY
BY DR. CHETAN SINGH SOLANKI

DAY 2

GRID CONNECTED WIND ENERGY CONVERSION SYSTEM
BY DR. RAGAVAN KANAGARAJ

DAY 3

DIGITALLY CONTROLLED CONVERTER SYSTEM FOR PHOTOVOLTAIC APPLICATIONS
BY DR. P. V. THAKRE

DAY 4

DESIGN& DEVELOPMENT OF VSC-BASED FACT CONTROLLER
BY DR. M. A. MULLA

DAY 5

ANALYSIS OF POWER ELECTRONIC CONVERTERS FOR PHOTOVOLTAIC SYSTEMS
BY DR. P. J. SHAH

ON GRID PV SOLAR ROOFTOP POWER PLANT INSTALLATION AND ASSESSMENT
BY MR. M. M. ANSARI

DAY 6

SOLAR PHOTOVOLTAIC'S FUNDAMENTALS AND APPLICATIONS
BY DR. A. K. PANCHAL

VALEDICTORY FUNCTION
BY DR. A. K. PANCHAL

DR.CHETAN SINGH SOLANKI

PH.D.

Professor
Indian Institute of Technology Bombay & Founder,
Energy Swaraj Foundation, Maharashtra
Specialization in Solar Photovoltaics

TOPIC DELIVERED AT STTP:

ENERGY SWARAJ: ESSENCE OF SUSTAINABILITY

ABSTRACT:

Energy is everything and everything is energy. Energy is also the major contributor to carbon emissions and therefore, consequential climate change. In the last 20-30 years, we have seen a steep rise in carbon emissions crossing over 415 ppm. Given the current trajectory of energy consumption and thereof generation, energy will become a commodity that will be accessible only to the rich and the poor who have been categorically denied access to it for centuries will be compelled to live in the darkness forever. To ensure access to energy is sustainable for future generations, the current energy patterns need to be relooked. Albeit, the solution lies in going to the basics and bringing in a discipline in the current lifestyle. The cue to curb the energy over-exploitation lies in the Gandhian philosophy of Gram Swaraj, and based on this, the idea of Energy Swaraj is conceptualized. Under Energy Swaraj, the communities or the locals not only consume and generate their own energy needs but also helps in generating technology-based livelihoods, a robust rural economy, empowering the local communities, etc. In this perspective, Energy Swaraj is just not generating and consuming energy using renewable sources. It is new sustainability and the economic model enters around energy. Policymakers and politicians around the world can ignore it and suffer or accept it and flourish.

OUTCOME:

- The urgency to act against climate change
- The relevance of Decentralized Energy Generation & Consumption
- Establishing viability of solar energy

DR. RAGAVAN KANAGARAJ

PH.D.

Associate Professor
Indian Institute of Technology Gandhinagar, Gujarat
Specialization in Electrical Machines and Power Electronics

TOPIC DELIVERED AT STTP:

GRID CONNECTED WIND ENERGY CONVERSION SYSTEM

ABSTRACT:

Energy conversion from wind to mechanical form is achieved with the aid of wind turbines. The conversion from mechanical to electrical form is through an electrical generator. Although the speed of the turbine is very low, a high-speed electrical generator is preferred. With this, size of the generator gets reduced. However, connecting a low-speed turbine to a high-speed generator requires a gear system. Induction generator is widely used in wind energy conversion system. This is mainly because of the fact that the stator windings can be directly connected to the grid. The reactive power requirement is met by the grid and the induction generator supplies active power to the grid. This doubly-fed induction generator requires a lower rating power electronic converter in the rotor side to extract or feed slip power.

OUTCOME:

- Understanding the operation of induction generator below and above synchronous speed.
- Understanding the need for accurate control of slip power and feeding it to the rotor circuit for sub-synchronous operation.

DR. PRASHANT V. THAKRE

PH.D.

Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Solar Photovoltaic System

TOPIC DELIVERED AT STTP:

DESIGN, MODELING AND PERFORMANCE STUDY OF DIGITAL CONTROLLER FOR SOLAR PHOTOVOLTAIC SYSTEM

ABSTRACT:

In residential PV applications, if the types of loads connected to the PV inverter are uncertain then these nonlinear loads could cause intense distortion in the output current and voltage waveform. Therefore, a high-performance inverter is required to maintain the desired output voltage waveform overall loading conditions and transients. Thus to overcome the energy crises in India, low-power photovoltaic units could be implemented at each rooftop which could fulfill the household requirement. Also, an extra amount of power generated could be fed to the grid. To achieve this proper photovoltaic inverter system is to be selected with an appropriate tracking method. To make the system more flexible digital control could be used.

OUTCOME:

By considering the PSO technique in MATLAB/Simulink model the PWM signals were improved based on the output voltage and current sensed by the controller. The MPPT technique was able to stabilize the DC signal for charging of battery at nearly 28 volts. The output AC voltage and current of the inverter were very close to sinusoidal. Also, the current THD value was 1.78% which is well below per IEEE standard. The hardware prototype model for 1 kilowatt was also experimented with and investigated successfully. As per the observation shown in the table for the 1-kilowatt prototype model, the crest factor (ratio of peak value to effective value) at different load values was very near to the ideal value of 1.414 which gives the perfection in sinusoidal output.

DR. M. A. MULLA

PH. D.

Associate Professor
Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat
Specialization in Power Electronics, Renewable Energy, Power Quality and Electrical Drives

TOPIC DELIVERED AT STTP:

DESIGN & DEVELOPMENT OF VSC-BASED FACT CONTROLLER

ABSTRACT:

VSC-based FACT Controller is finding wide application if present-day power system. Shunt, series, and shunt-series (combined) controllers are explored. This lecture aims to explain to the delegates the design and development of 1 kVA laboratory prototype of the VSC-based FACT Controller. Design of power circuit components along with control logic implementation in ARM Cortex-M4 32-bit microcontroller is explained to the delegates.

OUTCOME:

- The significance of power quality and present-day power systems are discussed.
- Effect of Displacement Power Factor (DPF) and its mitigation are elaborated.
- VSC-based FACTScontroller for DPF: Series, Shunt, Combined are discussed.
- A laboratory prototype to study the VSC-based FACTS controller is presented.

DR. PARESH J. SHAH

PH.D.

Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Power Electronics, Power Quality, VLSI Design

TOPIC DELIVERED AT STTP:

ANALYSIS OF POWER ELECTRONIC CONVERTERS FOR PHOTOVOLTAIC SYSTEMS

ABSTRACT:

Power Electronic Converters for Solar Photovoltaic Systems provides design and implementation procedures for power electronic converters and advanced controllers to improve standalone and grid environment solar photovoltaic's performance. Renewable energy often referred to as clean energy, comes from natural sources or processes that are constantly replenished. There are many benefits to using renewable energy resources, it is a critical part of reducing global carbon emissions and the pace of investment has greatly increased as the cost of technologies falls and efficiency continues to rise. Power electronic converters play the important role of making electrical energy from the solar panel or wind turbine and convert it to required applications.

OUTCOME:

- Performance and improvement of solar photovoltaics under various conditions with the aid of intelligent controllers.
- With algorithm development and real-time implementation procedures, for those interested in power electronics for performance improvement in distributed energy resources
- Design of advanced controllers, and measurement of critical parameters surrounding renewable energy systems.
- The complete solution for performance improvement in solar PV with novel control techniques, in power electronic converters, renewable energy, and power quality.

MR. M MUJTAHID ANSARI

M.E.

Assistant Professor
SSBT's College of Engineering & Technology,
Jalgaon, Maharashtra
Specialization in Power System

TOPIC DELIVERED AT STTP:

ON GRID PV SOLAR INSTALLATION AND ASSESSMENT

ABSTRACT:

As the demand for solar electric systems grows, progressive builders are adding solar photovoltaic (PV) as an option for their customers. This overview of solar photovoltaic systems will give the builder a basic understanding of Evaluating a building site for its solar potential, Common grid-connected PV system configurations and components, Considerations in selecting components, Considerations in design and installation of a PV system, Typical costs, and the labor required to install a PV system, Building and electric code requirements and Where to find more information Emphasis will be placed on information that will be useful in including a grid-connected PV system in a bid for a residential or small commercial building. We will also cover those details of the technology and installation that may be helpful in selecting subcontractors to perform the work, working with a designer, and directing work as it proceeds. A summary of system types and components is given so the builder will know what to expect to see in a design submitted by a subcontractor or PV designer. Solar modules are usually mounted on roofs. If roof area is not available, PV modules can be pole-mounted, ground-mounted, wall-mounted or installed as part of a shade structure

OUTCOME:

- Able to understand legal procedure and permission for connecting On-grid PV Solar Plant.
- Able to understand the specification of PV module and selection as per the geographical condition.
- Design of PV string for best suitable for Inverters and its MPPT.
- Able to understand state electricity billing and the impact of the solar plants.
- Able to understand the technical performance of solar plants and financial analysis.

DR. ASHISH K. PANCHAL

PH.D. (IIT BOMBAY)

Professor
Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat
Specialization in Electrical Engineering and Solar Photovoltaics

TOPIC DELIVERED AT STTP:

SOLAR PHOTOVOLTAIC'S FUNDAMENTALS AND APPLICATIONS

ABSTRACT:

India has progressed much in the sector of renewable electricity generation and the generation contributes to nearly 20% of its share in the total generation. Wind and solar energy conversions are the major of them. For inculcating these technologies, a huge number of manpower is required from the R&D level to the technician level. As a part of that, the aforementioned STTP was conducted in which my contribution was towards the solar photovoltaic technologies. The session was started with the basics of the photovoltaic physical phenomena. The photovoltaic cell and PV module structures were introduced. The output, characteristics of these devices were discussed in the standard test conditions and how do their behavior change with environmental factors such as solar intensity and temperature. When the solar PV panels are connected to the loads, the interfacing electrical converters and their control were detailed. Then lastly, the solar PV applications were discussed. In the next session, a typical residential load was considered and its complete PV design was discussed step by step. Along with that, some economic aspects were also discussed.

OUTCOME:

- Learn and explain solar PV technologies.
- Learn and explain the behavior of the PV modules.
- Learn and understand the solar PV electrical system and its control.
- Understand the PV systemdesign.
- Design a basic domestic PV system.
- Understand the PV economics.

PRACTICAL SESSIONS AT STTP:
RENEWABLE ENERGY DEVELOPMENT
BY NATIONAL INFOTECH, SURAT

LABORATORIES:

DAY 1: Exploring WAIJUNG blockset with Matlab
DAY 2: Implementation of MPPT algorithm of Solar PV
DAY 3: Grid synchronization using PLL/FLL
DAY 4: Implementation of PV-Inverter
DAY 5: Implementation of PV-STATCOM

ABSTRACT:

This course aims to teach participants hands-on based learning of the development of Electrical Drives. The development of power electronics converters involves designing logic circuits, driver circuits, and power circuits. Good knowledge of AC, DC power conversion is essential. This course aims to teach participants the overall design of Electrical Drives. The development of renewable energy application aspects like MPPT algorithm of Solar PV, Grid synchronization using PLL/FLL, implementation of PV- Inverter and PV-STATCOM has been taught using ARM Cortex M4 32-bit microcontroller.

OUTCOME:

- Basics of Renewable Energy Development using Power Electronics Converter
- MPPT algorithm of Solar PV
- Grid synchronization using PLL/FLL
- Implementation of PV- Inverter, and PV-STATCOM

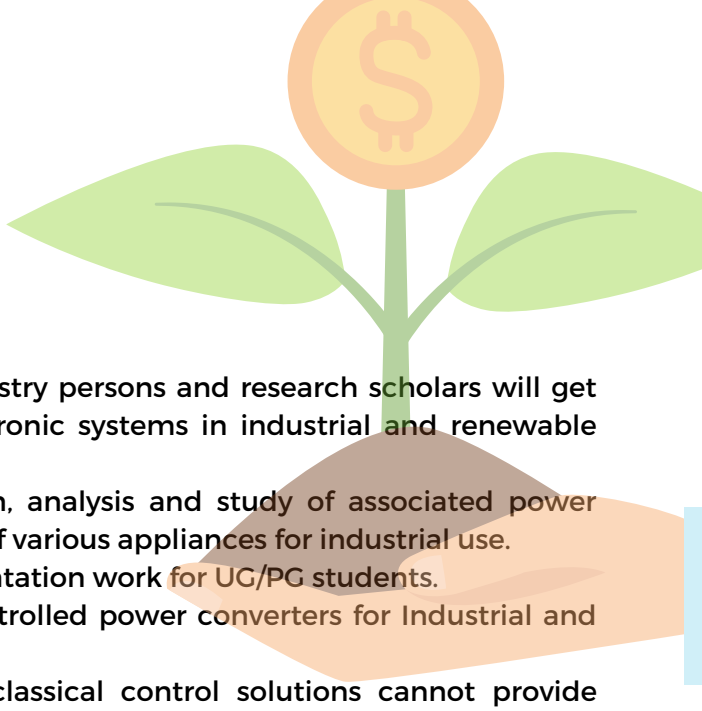
FEEDBACK

At the end of each STTP online test was conducted based on the sessions delivered. The participants took active participation and the certificates were issued to those participants having test score above 80%. Online feedbacks from the participants were also collected by steering committee. The feedback receive from the participants were overwhelming. At the end of each phase, some questionaries' were provided to the participants as a part of feedback in the form of google link. Each question was given weightage from 1 to 5 points. After receiving the feedbacks, it was analyzed. Nearly 85% participants rated as excellent and 15% rated as very good. Most of the participants also wrote some extra remarks, such as

- The renowned recourse persons were speak on recent topics and it well be helpful in research work.
- Quality of the program was very excellent.
- The practical sessions for each STTP was conducted by M/s National Infotech, Surat, Gujarat and it was very well appreciated by the participants.
- Practical sessions will helpful to teach the students and helpful for their projects.
- After identifying the today's need, very well aware about how to implement learning in teaching work so whenever required we will implement it.
- All knowledge and concept which is gained that will be forwarded to the students.
- Exploring more about Artificial intelligence, neural network will help in future work, it will implement in academic activities.
- Knowledgeable information and relevant to subject useful for career also.
- Got the knowledge about hardware implementation and new software tools.

Thus considering the feedback reports received from participants, we could say that the STTP's were conducted successfully. Also in future, such types of STTP's could organized on regular basis for knowledge updating, which could help the faculty members and researchers in their respective work.

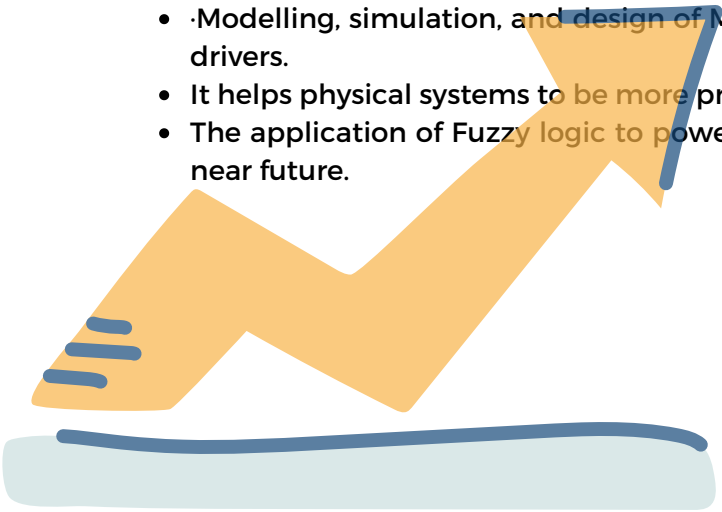
OUTCOME



After completion of program, faculty members, industry persons and research scholars will get knowledge about the use of advanced power electronic systems in industrial and renewable applications.

·They learned designing, modelling, implementation, analysis and study of associated power electronic controllers for monitoring and protection of various appliances for industrial use.

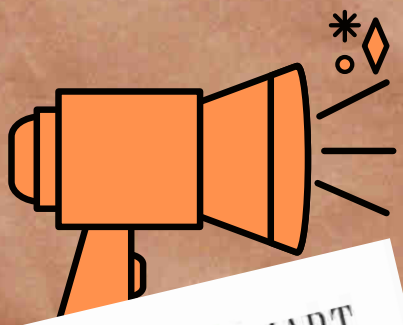
- Exposure to developing laboratories for experimentation work for UG/PG students.
- Scope in the research in the area of digitally controlled power converters for Industrial and Renewable Energy.
- Most promising applications are those where classical control solutions cannot provide satisfactory performance, typically when the model of the plant is not available or highly non-linear, or when the system is subject to significant parameter variation.
- Developed a basic understanding of solar photovoltaic supply systems for the grid and standalone operation.
- Technical exposure on design and development of solar PV supply system.
- Understand analysis of basic power electronics converters, and design switched-mode regulators for various industrial applications.
- Comprehend the concepts of different power converters and their applications
- ·Modelling, simulation, and design of Model Reference Adaptive Systems for Induction motor drivers.
- It helps physical systems to be more productive and autonomous.
- The application of Fuzzy logic to power electronics and drives will continue to flourish in the near future.



Thank you all for valuable support

DR. PARESH J. SHAH, PROFESSOR, E&TC DEPT., CONVENER

MEDIA COVERAGE



५ डिसेंबर २०२० | जळगाव SMART

एसएसबीटी अभियांत्रिकी महाविद्यालयात आठवड्यात ऑनलाईन तीन कार्यशाळा

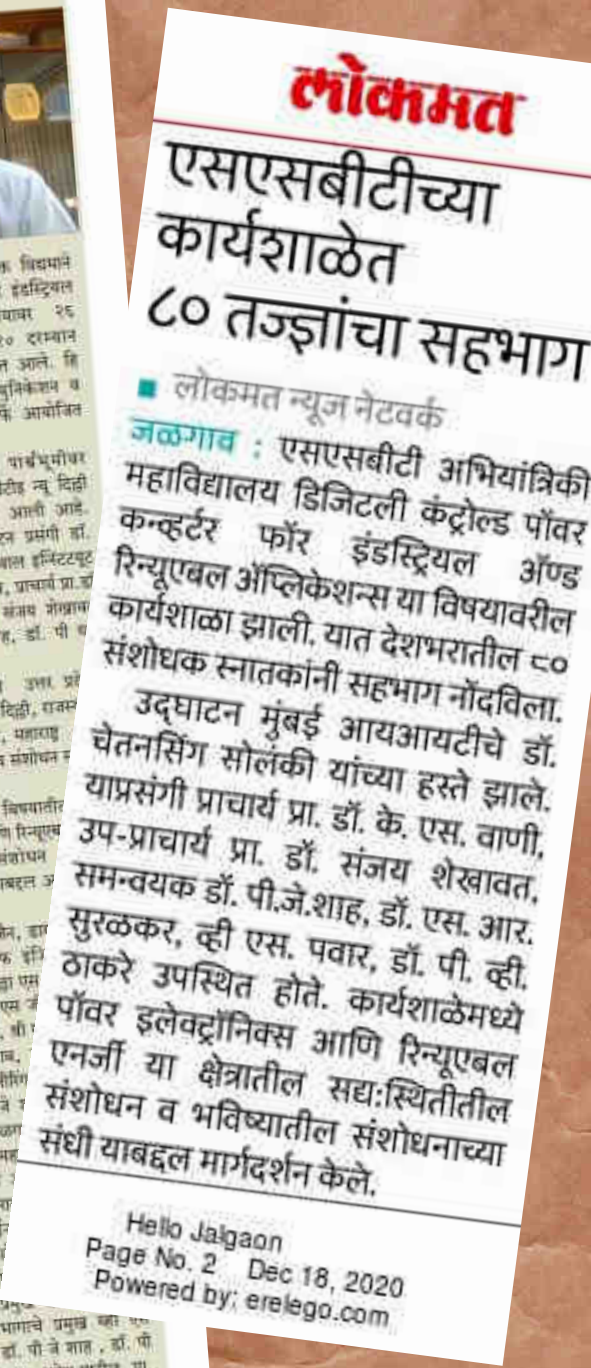
जळगाव: एसएसबीटी अभियांत्रिकी महाविद्यालय व एआयसीटीइ न्यू दिल्ली यांच्या संयुक्त विद्यमाने 'डिजिटली कंट्रोल्ड पॉवर कनवर्टर फॉर इंडस्ट्रियल अँड रिन्यूएबल ॲप्लिकेशन्स' या विषयावर १४ ते १९ डिसेंबर २०२० दरम्यान आयोजित कार्यशाळेचे उद्घाटन करण्यात आले. हि कार्यशाळा इलेक्ट्रॉनिक्स अँड टेलिकॉम्युनिकेशन व इलेक्ट्रीकल विभाग तर्फे

उद्घाटनीय भाषणात सांगितले कि पारंपारिक किंवा अपारंपरिक असो, लोकांनी शक्य तितक्या ऊर्जेचा वापर केला पाहिजे. ऊर्जा वाचवाबाबत मानवी मानसिकता बदलणे अत्यंत आवश्यक आहे. ते स्थानिक पातळीवर सौर ऊर्जेच्या पर्यायाने, उत्पादन आणि उपयोगासाठी ऊर्जा स्वराज यंत्रेवर आहेत. या कार्यशाळेसाठी देशातील उत्तर प्रदेश, मध्यप्रदेश, हिमाचल प्रदेश, हरियाणा दिल्ली, राजस्थान, गुजरात, गोवा, आंध्रप्रदेश, कर्नाटक, महाराष्ट्र अशा विविध

एसएसबीटी अभियांत्रिकी महाविद्यालयात एक आठवड्याचे ऑनलाईन कार्यशाळा आयोजित

एसएसबीटी अभियांत्रिकी महाविद्यालय जळगाव (खान्देश) प्रतिनिधी

एआयसीटीइ न्यू दिल्ली यांच्या संयुक्त विद्यमाने डिजिटली कंट्रोल्ड पॉवर कन्व्हर्टर फॉर इंडस्ट्रियल अँड रिन्यूएबल ॲप्लिकेशन्स या विषयावर २६ ऑक्टोबर - ३१ ऑक्टोबर २०२० दरम्यान आयोजित कार्यशाळेचे उद्घाटन करण्यात आले. हि कार्यशाळा इलेक्ट्रोनिक्स व टेलिकम्युनिकेशन व इलेक्ट्रीकल हि कार्यशाळा विभाग तर्फे आयोजित करण्यात आली आहे.



लोकमत

एसएसबीटीच्या कार्यशाळेत ८० तज्ज्ञांचा सहभाग

■ लोकमत न्यूज नेटवर्क

जळगाव : एसएसबीटी अभियांत्रिकी महाविद्यालय डिजिटली कंट्रोल्ड पॉवर कन्व्हर्टर फॉर इंडस्ट्रियल अँण्ड रिन्यूएबल ॲप्लिकेशन्स या विषयावरील कार्यशाळा झाली. यात देशभरातील ८० संशोधक स्नातकांनी सहभाग नोंदविला.

उद्घाटन मुंबई आयआयटीचे डॉ. चेतनसिंग सोलंकी यांच्या हस्ते झाले. याप्रसंगी प्राचार्य प्रा. डॉ. के. एस. वाणी, उप-प्राचार्य प्रा. डॉ. संजय शेखावत, समन्वयक डॉ. पी.जे.शाह, डॉ. एस. आर. सुरळकर, व्ही एस. पवार, डॉ. पी. व्ही. ठाकरे उपस्थित होते. कार्यशाळेमध्ये पॉवर इलेक्ट्रॉनिक्स आणि रिन्यूएबल एनर्जी या क्षेत्रातील सद्य:स्थितीतील संशोधन व भविष्यातील संशोधनाच्या संधी याबद्दल मार्गदर्शन केले.

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एसएसबीटीमध्ये 'डिजिटली कंट्रोल्ड पॉवर'वर कार्यशाळा

३१ ऑक्टोबर रोजी मान्यवरांच्या उपस्थितीत होणार समारोप

प्रतिनिधी | जळगाव

एसएसबीटी अभियांत्रिकी महाविद्यालय व एआयसीटीइ (न्यू दिल्ली) यांच्या संयुक्त विद्यमाने 'डिजिटली कंट्रोल्ड पॉवर कनेक्शन फॉर इंडस्ट्रियल अँण्ड रिन्यूएबल ॲप्लिकेशन्स' या विषयावर २६ ते ३१ ऑक्टोबरदरम्यान कार्यशाळा घेण्यात येत आहे. कोविड-१९च्या पार्श्वभूमीवर संशोधनाला गती देण्यासाठी एआयसीटीइतर्फे तीन कार्यशाळेला संमती दिली आहे. यातील पहिल्या कार्यशाळेचे उद्घाटन झाले.

या वेळी डायरेक्टर ऑफ संत लोंगोवाल इन्स्टिट्यूट ऑफ इंजिनिअरिंग अँण्ड टेक्नोलॉजीचे डॉ. शैलेंद्र जैन (पंजाब) यांनी मार्गदर्शन केले. या वेळी प्राचार्य प्रा. डॉ. के. एस. वाणी, उपप्राचार्य प्रा. डॉ. संजय शेखावत उपस्थित होते. कार्यशाळेसाठी डॉ. एस. आर. सुरळकर, व्ही एस पवार, डॉ. पी जे शाह, डॉ. पी. व्ही. ठाकरे, डॉ. पी. एच. झोपे, प्रा. अमोल वाणी, प्रा. धनेश पाटील, प्रा. नीलेश महाजन, प्रा. सतपाल राजपूत,

८० प्राध्यापक झाले सहभागी

या कार्यशाळेत उत्तर प्रदेश, मध्य प्रदेश, हिमाचल प्रदेश, हरियाणा दिल्ली, राजस्थान, गुजरात, गोवा, आंध्र प्रदेश, कर्नाटक, महाराष्ट्र अशा विविध राज्यांतून ८० प्राध्यापक, संशोधन, स्नातक यांनी सहभाग नोंदवला आहे. कार्यशाळेत विविध विषयांतील तज्ज्ञ व्यक्तींकडून पॉवर इलेक्ट्रानिक्स व रिन्यूएबल एनर्जी क्षेत्रातील सद्य:स्थिती व भविष्यातील संशोधनाच्या संधी याबद्दल मार्गदर्शन मिळेल.

योगेश पाटील हे सहकार्य करत आहेत.

या तज्ज्ञांचा सहभाग : डायरेक्टर ऑफ संत लोंगोवाल इन्स्टिट्यूट ऑफ इंजिनीरिंग अँण्ड टेक्नोलॉजीचे डॉ. शैलेंद्र जैन (पंजाब), डॉ. एम ए. मुल्ला (सुरत), डॉ. शैलेंद्र कुमार (इंदूर), डॉ. के. बी. खानचंदानी (शेगाव), डॉ. कृष्णकुमार गुप्ता (पंजाब), डॉ. पी. जे. शाह, डॉ. पी. व्ही. ठाकरे (जळगाव) या तज्ज्ञांचा सहभाग आहे.

STEERING AND ORGANIZING COMMITTEE OF AICTE SPONSORED ONLINE SHORT TERM TRAINING PROGRAM DIGITALLY CONTROLLED POWER CONVERTERS FOR INDUSTRIAL & RENEWABLE APPLICATIONS UNDER AQIS SCHEME PHASE-I, II & III

SEATING: FROM LEFT MR. V. S. PAWAR, DR. S. R. SURALKAR, DR. K. S. WANI, DR. S. P. SHEKHAWAT, DR. P. J. SHAH, DR. P. V. THAKRE, STANDING: FROM LEFT MR. N. S. MAHAJAN, MR. S. D. RAJPUT, MR. A. C. WANI, DR. P. H. ZOPE, MR. YOGESH PATIL.